The Municipality of George Town,
PENANG.

TROPICAL DISEASES BUREAU
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HEALTH OFFICER'S
ANNUAL REPORT
For the Year 1921.

PENANG
THE CRITERION PRESS, LIMITED.
1922.

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STATISTICAL SUMMARY.

Situation	Lat. 5° 24′N. Long 100° 1′E.
Average Elevation above L. W. M. O. S. T.	Town area 12′6″ Country area 25′0″
O. S. Tides rise and fall	9′0″
Rainfall 1921 (average of three readings within Municipal Limits).	130·9 inches
Mean Temperature 1921	80.8° F.
Maximum do	89·4° F.
Minimum do	72·2° F.
Total area of Penang Island	108 sq. miles.
Area within Municipal Limits	9·4 sq. miles or 5803 acres.
Number of houses occupied	13,813
do unoccupied	1,376
Estimated population (mid-year)	123,300
Density of population	13.117 per sq. mile. 21·2 per acre.
Crude Death Rate	30·61 per mille.
Birth Rate	30·56 per mille.

STAFF OF THE HEALTH DEPARTMENT

ON 31st DECEMBER, 1921.

J. Stuart Rose	M. B., D. P. H. Health Officer, Registrar of Births and Deaths, Deputy Superintendent of Vaccination, Honorary Superintendent of Maternity Hospital, Medical Superintendent Infectious Diseases Hospital.	
G. S. Glass	B. A., M. B., D. P. H., D. T. M. and H. Deputy and Assistant Health Officer, Deputy Registrar of Births and Deaths, Deputy Superintendent of Vaccination.	
Vacant)	Deputy Registrar of Deaths.	
(Vacant)	Assistant Surgeon.	
W. A. Ward	Chief Sanitary Inspector, joined the service	1st January, 1891.
A. A. Jeremiah	Sanitary Inspector, joined the service	1st January, 1904.
J. S. Reutens	do do	1st January, 1905.
H. L. McCulloch	do (temporary) do	5th January, 1912.
R. J. Rangel	Sanitary Sub-Inspector, do	1st October, 1913.
P. P. Aeria	do do	1st June, 1914.
B. B. Peters	do do	1st May, 1918.
G. Martinez	do do	1st November, 1918
M. D'Souza	do do	1st April, 1919.
G. F. Scully	do do	11th July, 1919.
A. Mathuray	do do	10th October, 1919.
J. Loh	do do	17th May, 1921.
W. P. P. Pereira	do do	17th May, 1921.
Ow Leong Chye	do do	1st July, 1921.
E. V. Leasler	do do	1st July, 1921.
P. Preedy	do do	1st July, 1921.
U. Balhetchet	do do	1st August, 1921.
V. Rozells	Sanitary Sub-Inspector (temporary) joined the service	1st September, 1921.
Lim Thean Soo	do do	1st September, 1921.
Miss A. Laurie	District Nurse	
(Vacant)	do	

Seven Certified Chinese Midwives as part time District Nurses

MUNICIPAL HEALTH OFFICE,

Penang, 3rd March, 1922.

To

THE MUNICIPAL COMMISSIONERS,

GENTLEMEN,

I have the honour to submit the following report on the health of the Municipality during 1921.

Population.

The Census was taken on 25th April and the population as stated in the preliminary report was 123,187 divided among the various nationalities thus:—

TABLE I

Nationality.	Males.	Females.	Total.
European	656	407	1,063
Eurasian	679	819	1,498
Chinese	50,449	32,153	82,602
Malay	8,523	8,613	17,136
Indian	15,105	4,430	19,535
Others	748	605	1,353
Total ...	76,160	47,027	123,187

The numbers of European males and females, Eurasian females, Indian females, and males and females of other nationalities were all less than we had estimated. This over-estimate was more than counterbalanced by the increase in Chinese and Malays of both sexes.

In the annual report for 1920, referring to the disproportionate increase in the birth rate, compared with the estimated increase in the population, the statement was made that "this ....is probably due to an increase in the proportion of females to males."

The Census report makes me doubt the accuracy of this opinion as the proportion of males to females is slightly higher than we estimated in 1920.

On the other hand, the Superintendent of Census thinks that "there is little doubt that in the last four months" [i. e. before the Census was taken] "the depression in the planting industry has driven many agricultural coolies into the towns and swelled the urban at the expense of the country population."

If he is correct, the figures now recorded give an over-estimate of our true adult male population, and for the next ten years our statistics will suffer both in this respect and by giving an under-estimate of the death rate and of the birth rate.

The estimated population for the middle of the year is 123,300.

Births.

In 1921 there were 3768 births registered, the birth rate being 30·56 per thousand. The figures for 1920 were, births 3321, birth rate 30.67.

Reckoned on the female population alone, the rate was 80.05 per thousand ; in 1920 it was 77.67 per thousand.

The apparent decline in the birth rate is due to the fact that the increase of 447 in the number of births does not compensate for the increase of 15,114 in the estimated population.

The number of births and the birth rates for the various nationalities were as follows :—

TABLE II

Nationality.	Number of Births.			Birth rate per thousand.	
	Males.	Females.	Total.	Total. Population.	Female Population.
European	21	27	48	45·15	117·93
Eurasian	35	36	71	47·39	86·69
Chinese	1,378	1,245	2,623	31·75	81·57
Malay	292	265	557	32·5	64·66
Indian	230	207	437	22·37	98·64
Other nations	21	11	32	23·65	52·89

During the previous ten years the births registered were —

TABLE III

Year.	European.	Eurasian.	Chinese.	Malay.	Indian.	Others.	Total.
1911	21	30	1,249	361	388	84	2,133
1912	37	44	1,408	440	415	77	2,421
1913	29	40	1,492	398	423	82	2,464
1914	27	57	1,575	368	445	72	2,545
1915	46	38	1,774	478	403	78	2,808
1916	34	47	1,785	362	390	90	2,708
1917	39	44	2,010	463	472	71	3,099
1918	57	53	2,008	403	381	38	2,940
1919	41	51	2,134	481	467	29	3,203
1920	46	43	2,250	468	464	50	3,321
Average for ten years.	38	45	1,765	422	425	67	2,764
1921	48	71	2,623	557	437	32	3,768

The Eurasian, Chinese, Malay, and total births are the highest yet recorded.

A comparison of the births and deaths in the different nationalities may be of interest:—

TABLE IV

Nationality.	Births.	Birth rate per thousand.	Deaths.	Death rate per thousand.
European	48	45.15	10	9.4
Eurasian	71	47.39	26	17.35
Chinese	2,623	31.75	2,213	26.79
Malay	557	32.5	394	22.99
Indian	437	22.37	629	32.14
Other nations	32	23.65	41	30.3

Deaths.

The gross total of deaths within Municipal Limits during the year was 3,775 and the crude death rate 30.56, of this number 462 were not normally resident in Penang and had been less than three months within Municipal limits. Omitting these, we have 3,313 deaths, and a corrected death rate of 26.37 per thousand.

This rate is more than 8 per thousand lower than the average for the preceding ten years, and almost 6 per thousand lower than that of the year 1920.

Two reasons for this reduction are very obvious, (a) the great increase in our estimated population, which accounts for a reduction of about 3.5 per thousand, and (b) our fortunate freedom from any serious epidemic during the year.

The following table shows the distribution of the deaths in all groups and nationalities.

TABLE V.

NATIONALITIES.	SEX.	AGES.											Total	Grand Total.
		Under 1 year.	1 to 5 years.	5 to 15 years.	15 to 25 years.	25 to 35 years.	35 to 45 years.	45 to 55 years.	55 to 65 years.	65 to 75 years.	over 75 years.	Unknown.		
European ...	M.	...	1	...	..	..	1	...	..	1	...	...	3	10
	F.	3	..	..	...	...	...	1	..	2	1	...	7	
Eurasian ...	M.	4	...	...	...	1	...	3	2	1	1	...	12	26
	F.	2	...	...	1	3	4	1	1	1	1	...	14	
Chinese ...	M.	264	103	41	84	221	284	267	155	65	33	39	1556	2222
	F.	188	75	52	35	79	58	58	50	41	27	3	666	
Malay ...	M.	31	20	9	13	18	16	18	22	13	13	...	173	388
	F.	42	22	9	26	22	23	13	15	22	20	1	215	
Indian ...	M.	46	18	13	50	111	87	45	35	18	11	24	458	626
	F	44	28	15	19	18	15	6	8	7	3	5	168	
Other Nationalities	M.	2	1	...	3	2	5	2	3	1	1	...	20	40
	F.	5	5	...	1	2	...	3	2	1	1	...	20	
Unknown ...	M.	...	...	...	...	...	...	...	...	...	...	1	1	1
	F.	...	...	...	...	...	...	...	...		...	...	..	
Total ...	M.	347	143	63	150	353	393	335	217	99	59	64	2223	3313
	F.	284	130	76	82	124	100	82	76	74	53	9	1090	
Grand Total ...		631	273	139	232	477	493	417	293	173	112	73		

Compared with 1920, there were 12 more Malay deaths reported; the other nationalities show a decrease.

The total deaths of each nationality in the last ten years is shown here.

TABLE VI.

Year.	European.	Eurasian.	Chinese.	Malay.	Indian.	Others.
1912	9	43	2,324	338	833	54
1913	9	30	2,276	460	759	55
1914	10	35	2,260	506	715	48
1915	8	36	2,087	473	565	37
1916	11	35	2,119	436	527	33
1917	11	36	2,484	549	688	59
1918	9	26	2,930	479	927	56
1919	13	34	2,539	528	872	38
1920	11	44	2,398	382	676	42
1921	10	26	2,213	394	629	41

Infant Mortality.

The infant mortality was 165 per thousand births. The lowest rate previously recorded for the Municipality was 205 in 1920, and the average for the preceding ten years 251.

This improvement is encouraging, but our infant mortality is still about twice as great as that of England and Wales.

A great many of our infant deaths might be prevented by cleanliness and skilful attention.

Our Municipal District Nurse is doing good work by teaching mothers how to take care of their babies, but one Nurse cannot give all the instruction that is required.

We may repeat with feeling the words of Sir George Newman, "Much remains to be done to ensure that every woman in child-birth shall receive proper and adequate attention—ante-natal, natal, post-natal."

He is speaking of conditions in England, where Maternity homes and hospitals, infant welfare centres, and out-patient departments for infants are fairly well provided, and even the question of a pure milk supply is considered.

It is to be feared that most towns in the East might still take to heart the words written by Dr. Farr, the Registrar General, in his 1864 report, "the children of the idolatrous tribe who passed them through the fire to Moloch scarcely incurred more danger than is incurred by the children born in several districts of our large cities."

The causes of our infant deaths and the combating of those causes demand our closest attention, and it is to be hoped that by making the best use of the means at our disposal the infant mortality will be still further reduced.

Of the 631 infants who died in 1921, there were 273 under one month of age, 127 between one and three months, and 231 between three and twelve months.

I append a table to show the infant mortality in the various nationalities and a comparison with 1920.

TABLE VII.

Nationality.	Births 1921	Deaths under one year 1921.	Infant deaths per thousand births. 1921.	1920.
European	48	3	62	nil
Eurasian	71	6	84	186
Chinese	2,623	442	168	211
Malay	557	73	131	147
Indian	437	100	229	267
Others	32	7	218	100
Total ...	3,768	631	165	205

The chief causes of infant deaths are shown in Table VIII and the mortality compared with that in previous years from the same causes.

TABLE VIII.

INFANT DEATHS PER THOUSAND BIRTHS.

	1913	1914	1915	1916	1917	1918	1919	1920	1921
Tetanus	60	49	56	40	40	30	39	34	22
Intestinal diseases ...	64	62	60	63	68	61	71	54	38
Respiratory diseases ...	58	44	36	51	53	54	46	41	31
Prematurity and Debility ...	63	66	46	50	57	46	48	47	32
Convulsions	5	7	11	12	13	12	9	9	24

These causes accounted for 564 of the 631 infant deaths which occurred.

We are still losing over two per cent of our babies from Tetanus,—a striking testimony to the need for more trained midwives and more education for mothers.

It is a great pity that all schoolgirls are not taught at least the rudiments of nursing and the right way to look after a baby. It is really heartrending to hear of the homicidal applications that are in daily use for the cord of new born babies in Penang.

The reduction in the number of cases of tetanus in infants from 114 in 1920 to 83 in 1921 may be more apparent than real. It is accompanied by an increase in the number certified as dying of convulsions, from 30 in 1920 to 92 in 1921.

The unsatisfactory nature of our death statistics has often been commented upon. A brief investigation of the infant deaths certified as due to convulsions is a good example of our difficulties.

I am not trying to criticize the men who have acted as Deputy Registrars of Deaths. They are confronted with the body of a dead infant and a weird mass of misleading and often contradictory information, from which they must form a diagnosis; for the people are not yet sufficiently advanced to insist on a proper post-mortem examination being made in every doubtful case.

It is not surprising that different men should form different conclusions from such evidence as to the probable cause of death.

For nine and a half months one officer did the whole work of the Deputy Registrar of Deaths, and during that time he returned six infants as having died of convulsions. During the remaining two and a half months no less than 51 were similarly diagnosed by a different D. R. D. while in the same period no corresponding increase appeared in the returns coming from Hospital and private practitioners.

This leads one to suspect that the only reliable figures shown hitherto in this section are the total births, total infant deaths, and total infant mortality.

I have therefore compared the D. R. D.'s returns with those from Hospitals and private practitioners to see if there was any great difference in the proportion of infant deaths assigned in these two groups to the five main headings given in Table VIII.

I find that of the 564 deaths attributed to these five headings, the D. R. D. certified 425 and private practitioners and Hospitals certified 139, that is approximately D. R. D. three to one from other sources.

I append a table to show the proportion certified under each heading.

TABLE IX.

	Infant Deaths per thousand Births		
	Total.	Certified. By D. R. D.	Certified by others.
Tetanus	22	18	4
Intestinal diseases	38	30	8
Respiratory diseases	31	18	13
Prematurity and Debility	32	29	3
Convulsions	24	16	8

A table is given to show a comparison between births, infant mortality, and general death rate for the preceding ten years and for 1921.

TABLE X

Year.	Estimated population.	Births.		Deaths under 1 year.		Deaths at all ages.	
		Total	Rate per thousand population.	Total.	Rate per thousand births.	Total.	Rate per thousand population.
1911	101,182	2,133	21.03	613	287	3,823	37.69
1912	102,167	2,481	23.69	633	261	3,605	35.28
1913	102,913	2,464	23.95	703	284	3,595	34.93
1914	103,664	2,545	24.55	664	260	3,577	34.50
1915	104,420	2,808	26.89	671	239	3,206	30.70
1916	105,183	2,708	25.75	692	255	3,162	30.00
1917	105,950	3,099	29.25	831	269	3,831	36.16
1918	106,723	2,940	27.55	673	229	4,430	41.50
1919	107,502	3,203	28.86	782	244	4,024	37.43
1920	108,286	3,321	30.67	681	205	3,554	32.82
Average for the preceding ten years.	104,798	2,765	26.38	694	251	3,681	35.08
1921	123 300	3 768	30.56	631	165	3,313	26.87

Deaths.

Table XI shows the age, sex, and cause of death certified ; 1398 of the certificates were from Hospitals or private practitioners, 89 from the coroner, and 1826 from the Deputy Registrar of Deaths.

In other words less than half of the cases were under medical attention before death. As the number of post-mortem examinations made was so small as to be negligible, the diagnoses here tabulated must be accepted with reserve.

TABLE XI.

Deaths from	Sex.	Under 1 year.	1 to 5 years.	5 to 15 years.	15 to 25 years.	25 to 35 years.	35 to 45 years.	45 to 55 years.	55 to 65 years.	65 to 75 years.	over 75 years.	Unknown.	Total.	Grand Total.
1. Specific febrile or Zymotic diseases.														
Small pox ...	M.	...	...	...	...	1	1	...	..	...	...	...	2	2
	F.	...	..	...		...	..	...	...	...	...	...	..	
Enteric fever ..	M	...	...	...	6	3	2	3	1	...	...	...	15	17
	F.	...	...	...	1	...	1	...	...	...	...	..	2	
Diarrhoea ...	M.	16	5	3	...	6	2	2	1	...	...	...	35	52
	F.	10	...	1	...	1	...	1	1	3	...	...	17	
Dysentery ...	M.	1	3	4	8	27	27	15	6	2	1	...	94	115
	F.	1	...	1	2	10	1	3	2	1	...	.	21	
Remittent fever ...	M.	1	4	2	1	3	4	2	1	...	...	...	18	20
	F,	...	...	2	..	...	...	...	..	...	...	...	2	
Intermittent fever	M.	...	...	...	...	...	1	...	..	...	...	...	1	1
	F.	..	.	...	..	...	...	...	...	...	...	...	...	
Unspecified fever	M.	2	14	2	9	9	18	12	9	1	2	...	78	116
	F.	6	8	6	4	6	3	3	2	...	...	...	38	
Syphilis ...	M.	2	...	...	3	2	8	1	...	..	...	...	16	18
	F.	1	...	...	...	1	..	...		...	...		2	
Puerperal fever ...	M.	...	...	...	..	...	...	...	...	...		..		20
	F.	...	...	...	11	9	...	..	.	...	...	...	20	
Other Septic diseases ...	M.	5	1	2	1	1	3	5	5	1	1	1	26	42
	F.	6	1	1	...	3	3	1	...	1	...	...	16	
Phthisis ...	M.	1	2	6	31	84	121	95	62	18	1	...	421	580
	F.	...	4	7	20	41	37	23	19	8	...	...	159	
Other Tubercular diseases ...	M.	2	16	7	1	3	3	7	3	1	...	...	43	72
	F.	...	10	9	2	1	4	1	1	...	1	..	29	
Leprosy ...	M.	..	...		.	...	1		2	...	..	1	4	5
	F.	...	...	...	.	...	...	...	1	..	...	..	1	
Tetanus .	M.	51	...	2	...		2	1	1	1	..	..	58	91
	F.	32	...	...	...	1	...	...	..	...	...	...	33	
Influenza ...	M.	1	6	...	2	4	4	2	1	1	...	..	21	38
	F.	2	2	1	4	...	4	1	2	...	1	...	17	
Diphtheria ...	M.	...	1	1	-	...	-	...	...	...	...	...	2	4
	F.	...	1	...	1	...	...	..	...	...	...	...	2	
Cerebro-Spinal Meningitis ...	M.	1	...	...	...	1	3	...		...	...	1	6	7
	F.	...	...	1	...	...	...	...	...	...	...	..	1	
Whooping Cough	M.	...	1	...	...	..	...	...	...	...		...	1	1
	F.	...	...	...	...	...	...	...	...	...	...	...	...	
Totals carried forward .	M.	83	53	29	62	144	200	145	92	25	5	3	841	1201
	F.	58	26	29	45	73	53	33	28	13	2	...	360	

Deaths from	Sex.	Under 1 year.	1 to 5 years.	5 to 15 years.	15 to 25 years.	25 to 35 years.	35 to 45 years.	45 to 55 years.	55 to 65 years.	65 to 75 years.	over 75 years.	Unknown.	Total.	Grand Total.
Brought forward	M.	83	53	29	62	144	200	145	92	25	5	3	841	1201
	F.	58	26	29	45	73	53	33	28	13	2	...	360	
II. Parasitic Diseases.														
Malaria ...	M.	10	22	8	36	62	64	50	37	13	1	4	307	420
	F.	9	18	19	9	17	11	12	12	6	...	...	113	
Malarial Cachexia	M.	...	..	...	1	1	..	1	.	1	...	...	4	5
	F.	...	..	...	...	...	1	...	..	..	...	...	1	
Worms ..	M	...	...	1	4	18	19	6	3	2	...	...	53	58
	F.	...	3	..	1	...	..	1	...	...	...	...	5	
III. Dietetic diseases.	M.													
	F.													
IV. Constitutional diseases.														
Rheumatism ..	M.	...	...	..	..	...	..	..	1	...	...	...	1	1
	F.	...	...	...	...	...	...	...	...	...	...	...	...	
Cancer ..	M.	...	...	...	1	3	6	4	3	2	1	...	20	37
	F.	...	...	..	...	1	3	7	3	3	..	...	17	
Anaemia ...	M.	1	..		1	...	1	2	1	1	...	..	7	10
	F.	..	..	1	..	1	1	...	...	...	...	...	3	
Beri-beri ...	M.	...	...	1	7	16	15	22	7	...	...	...	68	102
	F.	...	...	2	9	5	6	3	9	...	...	...	34	
	M.													
	F.													
	M.													
	F.													
V. Developmental diseases.														
Premature birth...	M.	22	...	...	...	...	...	...	...	...	...	...	22	41
	F.	19	..	...	.	..	..	...	...	.	...	..	19	
Old age ...	M.	..	...	...	..	...	..	3	9	32	44	...	88	173
	F.	...	.	...	...	...	...	2	3	31	48	1	85	
	M.													
	F.													
VI. Local diseases														
Convulsions ...	M.	42	9	6	...	1	...	1	.	..	...	1	60	124
	F.	50	13	1	..	...	...	..	...	...	...	...	64	
Other diseases of Nervous system	M.	...	2	..	2	3	2	1	2	...	...	...	12	21
	F.	1	2	1	...	...	..	1	3	1	...	...	9	
Organs of special sense ..	M.	...	...	...	...	...	...	...	...	...	...	...	...	1
	F.	...	...	1	...	...	...	..	...	...	.	...	1	
Circulatory system	M.	7	...	3	4	21	12	30	18	8	1	2	106	164
	F.	5	5	2	4	7	8	11	7	8	1	...	58	
Totals to carry forward ...	M.	165	86	48	118	269	319	265	173	84	52	10	1589	2358
	F.	142	67	56	68	104	83	70	65	62	51	1	769	

Deaths from	Sex.	Under 1 year.	1 to 5 years.	5 to 15 years.	15 to 25 years.	25 to 35 years.	35 to 45 years.	45 to 55 years.	55 to 65 years.	65 to 75 years.	over 75 years.	Unknown.	Total.	Grand Total.
Brought forward	M.	165	86	48	118	269	319	265	173	84	52	10	1589	2358
	F.	142	67	56	68	104	83	70	65	62	51	1	769	
Bronchitis ...	M.	44	12	1	1	1	1	2	4	...	...	...	66	126
	F.	36	17	2	.	1	.	3	1	...	...	...	60	
Pneumonia ...	M.	8	7	4	18	38	36	34	20	9	1	2	177	220
	F.	6	7	7	3	4	5	3	5	3	...	..	43	
Other diseases of Respiratory system	M.	17	11	3	3	12	12	7	3	1	1	1	71	98
	F.	9	9	3	..	3	1	1	1	.	...	...	27	
Enteritis ...	M.	68	24	3	4	1	3	1	1	1	..	..	106	186
	F.	48	27	3	1	..	1	...	.	...	...	...	80	
Diseases of Liver ..	M.	...	..	...	...	7	6	8	2	..	...	..	23	27
	F.		...	...	...	...	1	2	...	...	1	...	4	
Other diseases of Digestive system	M.	1	..	1	..	2	7	4	2	...	...	...	17	22
	F.	..	1	1	..	1	1	...	1	...	...	...	5	
Lymphatic System	M.													
	F.													
Glandlike organs of uncertain use ...	M.	..	...	...	..	...	..	1		...	...	...	1	1
	F.	...	...	...	...	..	..	...	..	..		...	...	
Urinary system ...	M.	...	1	3	1	9	3	5	7	2	2		33	54
	F.	1	1	...	2	3	2	3	3	6	...	..	21	
Generative Organs	M.	..	...	...	...	...	1	...	...	...	..	.	1	2
	F.	...	...	...	...	...	1	...	...	...	..	...	1	
Child birth and Abortion ...	F.	..	...	..	6	7	5	...	..	..	...	...	18	18
Bones and Joints ..	M.													
	F.													
Integumentary System ...	M.													
	F.													
VI. Violence.														
Accident and Negligence ...	M.	1	1	...	3	5	...	2	1	...	...	8	21	26
	F.	.	...	4	...	...	.	..	...	..	..	1	5	
Homicide, Suicide and Execution ..	M.	..	...	..	..	2	1	...	..	...	...	5	8	10
	F.		...	...	...	..	...	...	...	..	...	2	2	
VIII. Ill-defined Causes.														
Debility ...	M.	42	1	..	1	2	1	2	2	...	2	5	58	103
	F.	41	1	...	1	...	...	...	...	1	1	..	45	
Unknown ...	M.	1		...	1	4	2	2	1	...	...	32	43	51
	F.	1	...	...	1	1	...	...	.	...	...	5	8	
Sunstroke ...	M.	...	...	...	...	1	1	...		...	...	...	2	2
	F.	...	...	...	...	...	..	...	...	...	...	...	...	
Starvation ...	M.	...	...	...	...	...	...	...	...	..	...	1	1	1
	F.	...	...	...	...			...	...	...	...	...	...	
Diabetes ...	M.	...	...	...	.	...	...	2	1	2	1		6	8
	F.	...	...	...	...	..	...	...	...	2	...	...	2	
Totals ...	M.	347	143	63	150	353	393	335	217	99	59	64	2223	3313
	F.	284	130	76	82	124	100	82	76	74	53	9	1090	

A comparison between the numbers of deaths attributed to some of the principal causes in 1921 and in the preceding ten years is shown here.

TABLE XII

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	Average for preceding ten years.	1921
Phthisis ..	621	612	534	616	554	527	590	722	693	677	615	580
Malaria	865	787	500	469	421	473	455	478	606	505	556	420
Enteritis ...	192	167	220	213	2 2	213	266	257	318	265	231	186
Pneumonia ...	154	118	212	205	163	203	220	559	243	235	231	220
Bronchitis ...	121	124	140	103	80	98	148	198	152	146	131	126
Beri-beri ...	333	285	253	256	195	182	323	262	238	143	248	102
Debility ...	65	80	124	115	81	104	147	95	153	143	111	103
Dysentery ...	212	193	137	128	163	134	147	130	188	138	157	115
Tetanus ..	144	162	158	136	167	118	133	199	133	120	147	91
Old age ..	144	157	183	175	145	143	198	141	174	142	160	173
Unspecified fever ...	28	25	214	297	258	184	239	323	68	20	165	116
Small-pox ...	32	1	1	nil	8	41	7	16	142	18	~~nil?~~	2

The distribution of the chief causes of death among the various nationalities is shown in

TABLE XIII.

TABLE XIII

Certified cause of death	European	Eurasian	Chinese	Malay	Indian	Others	Total
Small-pox ...	...	..	...	1	1	..	2
Enteric Fever ...	...	...	11	1	5	...	17
Diarrhoea ...	...	1	39	7	5	...	52
Dysentery ...	...	...	70	1	44	...	115
Remittent Fever ...	...	...	20	..	...	...	20
Unspecified Fever ...	...	1	61	31	23	...	116
Syphilis ...	...	...	15	1	1	1	18
Puerperal Fever ...	...	1	6	8	5	...	20
Other Septic diseases ...	...	2	28	2	8	2	42
Phthisis ...	...	5	446	52	68	9	580
Other Tubercular diseases ...	...	...	39	19	14	...	72
Leprosy ...	...	...	4	1	...	...	5
Tetanus ...	...	...	73	8	10		91
Influenza ...	1	...	29	3	2	3	38
Cerebro-Spinal Meningitis ...	...	...	4	...	3	...	7
Diphtheria ...	...	...	3	...	1	...	4
Malaria ..	.	1	243	64	110	2	420
Worms ...	...	...	30	...	28	...	58
Beri-Beri ...	..	...	71	12	15	4	102
Cancer ...	...	...	27	4	4	2	37
Premature birth ...	...	...	24	7	10	..	41
Old age ...	1	1	97	48	25	1	173
Convulsions ...	1	...	80	23	17	3	124
Other Nervous diseases ...	...	...	20	1	..	..	21
Diseases of Circulatory System ...	2	8	119	15	19	1	164
Bronchitis ...	1	2	86	15	21	1	126
Pneumonia ...	1	1	131	15	67	5	220
Other Respiratory diseases ...	...	...	65	6	25	2	98
Enteritis ...	...	..	154	10	21	1	186
Diseases of Liver ...	...	...	23	...	4	...	27
Diseases of the Digestive System ...	...	1	14	3	3	1	22
Urinary System ...	...	...	37	6	9	2	54
Child birth & Abortion ...	...	...	9	6	3	...	18
Accident & Negligence ...	...	...	23	...	3	...	26
Homicide, Suicide and Execution ...	...	...	8	...	2	...	10
Debility ...	2	1	62	14	24	...	103
Unknown & other causes ...	1	1	51	4	26	1	84
Total ..	10	26	2222	388	626	41	3313

Seasonal Mortality :—

The deaths and death rate for each month are here recorded.

TABLE XIV

Month.	Deaths.	Death rate per thousand.	Month.	Deaths.	Death rate per thousand
January	293	31·61	July	302	28·90
February	252	30·11	August	256	24·49
March	268	28·91	September	263	26·01
April	257	28·65	October	272	22·43
May	285	27·27	November	264	26·10
June	357	35·30	December	244	23·35

Infectious Diseases :—

TABLE XV shows the incidence among the different nationalities of the principal infectious diseases which occurred during the year.

1921 Infectious Diseases.		Small-pox.	Chicken-pox.	Enteric fever.	Tuber-culosis.	Influenza.	Puerperal fever.	Cerebro-Spinal Meningitis.	Diphtheria.	Total.
European ...	M.	...	1	1	...	2	...	...	...	4
	F.	...	...	...	...	...	...	...	...	...
Eurasian ...	M.	...	5	1	4	...		...	...	10
	F.	..	3	...	1	...	1	...	...	5
Chinese ...	M.	1	3	10	366	17	..	6	2	405
	F.	...	...	3	113	12	4	1	2	135
Malay ...	M.	2	2	...	38	1	...	1	..	44
	F.	...	2	2	45	2	12	...	...	63
Indian ..	M.	..	45	6	55	1	...	8	1	116
	F.	...	6	...	24	1	3		...	34
Other Nations ...	M.	1	...	...	5	...	...	..	...	6
	F.		...	...	4	2	...	...	...	6
Total ...	M.	4	56	18	468	21	...	15	3	585
	F.	...	11	5	187	17	20	1	2	243
Grand Total ...		4	67	23	655	38	20	16	5	828

Small-Pox.

The year passed without any outbreak occurring. The details concerning the four cases which occurred are given. They were all admitted to our Quarantine Camp.

I. A man from India who had been in Penang three days before he was discovered.

He had been vaccinated many years before.

He had a severe attack of the discrete type, and was feeble and exhausted on admission, and died next day.

II. The "Syria" case. This ship arrived late one evening and by an extraordinary privilege contrary to all Quarantine regulations and granted exclusively to P & O vessels, was permitted to come alongside and discharge passengers without undergoing inspection by the Port Health Officer.

About 11 a.m. next day, a Goanese Steward on board was reported to have Small-pox, the rash being then both profuse and at the stage of commencing umbilication.

He developed a moderately severe attack of the discrete type. He had been well vaccinated and recovered.

The P & O privilege may have had some excuse as a war-time measure, but it might surely be revoked now.

No community, situated as we are, can afford to be exposed to any unnecessary risk of having a small-pox epidemic, however slight that risk may appear.

I am well aware that all ships' surgeons,—and those in the P & O service are by no means behindhand in this respect,—are extremely careful to watch for infectious disease on board; but mistakes are always possible, and quarantine regulations all the world over are devised to leave the least possible chance of a dangerous mistake escaping notice.

Ship's surgeons are usually glad of a second opinion and Port Medical Officers are specially qualified to diagnose doubtful cases

I see no reason why we in Penang should abandon in this matter the excellent safeguards provided in our quarantine regulations,—regulations which are the result of the world-wide experience of centuries.

III. A Chinese cooly was brought to camp one morning suffering from a severe attack of the confluent type.

He stated that he had come from Kulim to Penang the previous evening, and that he had slept during the night on the five-foot way in Carnarvon Street.

He had been vaccinated, and he recovered.

IV. A Malay policeman, who had been on duty in Singapore, where there were several cases of small-pox at the time, arrived by boat with the rash well out, and was immediately sent to Camp by the Chief Medical Officer from the Detective Station.

He had a moderately severe attack of the discrete type and died, never having been vaccinated. All those resident in the Detective Station were vaccinated and kept under observation.

Fortunately no further cases occurred, for which we have very largely to thank the Government Medical Officers who accurately diagnosed and promptly notified three of the four cases.

Vaccination.

The presence of Small-pox in towns with which we are in daily communication caused us some anxiety, even though we felt that we were not yet due for another epidemic.

We had therefore been considering what precautions we might take with-in the town without committing the fault of being unduly alarmist.

The occurrence of the fourth case suggested the advisability of commencing with the Police force, and with the kind co-operation of the Chief Police Officer, Major Dewar, and his Inspectors, we were enabled to vaccinate or re-vaccinate the whole force stationed in Municipal limits together with some of their dependants, the total number of vaccinations thus performed being 623 of which more than 500 were done in 1921 and the remainder in January 1922.

A further measure which should prove very useful is the vaccination of school children. I hope that this will be carried out early in 1922.

Little change was made in our system of infant vaccination. In the first half of the year our staff of Inspectors and Sub-Inspectors tried to keep in touch with each infant recorded, urging the parents to have vaccination performed early, and offering free vaccination to all who desired it.

Apart from the perennial difficulty resulting from incorrect addresses being recorded, it was found that this task interfered greatly with the routine inspections and other work of our staff; and when more Sub-Inspectors were employed I was glad to be able to leave the infant vaccination in the hands of our two senior Sub-Inspectors.

Their work has been satisfactory and we should have a very high proportion of the infants vaccinated, if we had the addresses accurately recorded on the birth reports.

There were 3768 births registered, our staff did 1425 primary vaccinations ; 1426 were done by others ; 631 infants died under the age of one year, mostly unvaccinated ; and in 46 reports the address was found to be incorrect.

It is still unfortunately too common a practice for parents to postpone vaccination as long as possible, instead of availing themselves at the earliest opportunity of the protection afforded at such trifling inconvenience.

Cerebro-Spinal Meningitis.

16 cases were notified, and 7 died. Nine cases were admitted to our Quarantine Camp, two died and seven recovered.

Enteric Fever.

23 cases were notified, 3 by the Deputy Registrar of Deaths, 1 by the Medical Officers of the Government Hospitals, and 19 by private practitioners.

Of the 17 deaths, the Deputy Registrar of Deaths reported 3, Hospitals 1, and private practitioners 13.

Tuberculosis.

Phthisis again heads the list of causes of death. Almost one-fifth of the total deaths were attributed to phthisis and other forms of tuberculosis.

Wind, soil, and milk have not been shown to have any distinct relation to the incidence of phthisis in Penang.

Dark and unventilated dwelling houses or rooms are recognized as most powerful agents in the causation and spread of the disease and in preventing its cure, and such conditions are prevalent over a large part of the town.

Not only is there lack of ventilation, but also gross overcrowding exists in a very large number of houses, and indeed in whole Divisions of the town.

We have laws under which we can prosecute offenders for allowing overcrowding, but it is not a simple matter to gain material improvement even with the help of such prosecutions.

It is no use trying to prove overcrowding by a day visit, the people found in the house would not be likely all to confess that they lived there, and probably a sufficient number would be declared to be " visitors from Province Wellesley ".

A night raid is therefore carried out, and with our present staff of men fully employed in the daytime we cannot do this very often.

On the raid we visit for example a Common Lodging House licensed for 50 lodgers and find 110 people sleeping there. On conviction, the keeper of the house is fined perhaps $ 132, (the maximum fine during the year for this offence) which sum he recovers in rent from his supernumerary lodgers in 15 days.

We licensed over 600 Common Lodging Houses last year, and I believe most of them to be overcrowded.

Three methods of combating the evil suggest themselves, we might with a large staff indulge in frequent night raids, the fines inflicted might be made very heavy, or the people might be enlightened by a long and intensive campaign of education. The last is obviously the best, no one wants to go on indefinitely fining people for wrongdoing, we want rather to see them learn to do right.

But the two first are meantime useful palliatives and have a distinct educational value.

For a propagandist campaign, the text might be the old Spanish proverb, " When the sun is shut out, the doctor comes in ; if the air is kept out, death enters,"—and the disease which introduces such death is most often phthisis.

Influenza :—

38 Fatal cases were notified.

In the previous year 88 deaths were recorded.

The possibility of the disease returning in epidemic form is being borne in mind.

Puerperal Fever.

Of the 22 cases reported, two recovered and the rest died.

Malaria and Unspecified Fever.

In 1920 the combined total of deaths under these two headings was 525, malaria 505, and unspecified fever 20 ; in 1921 it was 536, malaria 420, unspecified fever 116.

The explanation of these figures is interesting.

Our mosquito surveys led us to the belief that malaria was not likely to be acquired within Municipal limits, and therefore that the death rate from malaria was mostly if not entirely beyond our control.

The uncomfortable feeling remained that many of the deaths attributed on the meagre evidence available to malaria, by the Deputy Registrar of Deaths, might be due to some other cause, for example to Enteric fever.

For this reason, in the latter half of the year I told the Deputy Registrar of Deaths that it would be better to notify death as due to "unspecified fever," unless there was some proof that it was due to malaria.

He was instructed to take a blood film, if permitted to do so, in cases where he would in the ordinary way diagnose malaria.

This made him more chary of diagnosing malaria, as he naturally would like laboratory confirmation of his opinion. He submitted 50 blood films, but malaria parasites were found in only 19 of them.

The Chief Medical Officer, Penang, kindly arranged for the microscopic examinations to be made at the Government Laboratory.

Anti-Mosquito Work.

The Anti-Mosquito gangs again did good work all over the town, but especially in the suburban districts, where the constant task of cleaning "reserved roads" was well performed.

Much useful work was also done by filling in low-lying patches of ground, pits, and hollows, mostly at the expense of the owners of the land.

Along part of the Waterfall stream the banks were cleared, they had become much overgrown and in places large quantities of rubbish had been deposited.

A few men were employed in filling hollows in trees with sand and cement, such hollows being well-known breeding-places for mosquitoes.

The oiling gang worked as usual, 2440 gallons of kerosine and 5460 gallons of crude oil, were used; the cost of the oil was $3924, the corresponding figures for 1920 were, kerosine 2640 gallons, crude oil 4290 gallons cost $3993-80.

There was a great increase in the demand for anti-mosquito work to be done by our coolies on private land at the owners' cost. Altogether our men were so employed on 56 occasions as against six in 1920.

The small gang of Tamil boys continued to do excellent work clearing up minor breeding places for mosquitoes, such as coconuts and tins.

The Race Course ditches were again oiled weekly, and the Fort Moat also until it was filled up in November. The Lake at Lake Villa was also filled in during the year.

We continued to make special search for Anopheline breeding-places, and found *A. rossi* and *A. vagus* thirty two times within Municipal limits. Outside our limits we found *A. fuliginosus*, a dangerous mosquito, within a few yards of our boundary at the foot of the Chetty Temple hill. We also received an Anopheline from Glugor (*A. barbirostris*).

A moderate outbreak of malaria having occurred among the coolies working ~~no~~ on the Hill Railway, I investigated the upper part of the Ayer Itam stream within our limits, and for a few hundred yards beyond our limits, as well as the ground at the foot of the hills outside our limits in that direction but failed to find Anophelines breeding. The ground was rather dry at the time.

Educational.

Thanks to the courteous co-operation of the Inspector of schools and others, I was able to complete by April the course of lectures to school teachers on hygiene and public health in Penang which I had commenced in November 1920.

The lectures were well-attended and it was a pleasure to address so intelligent and appreciative an audience.

It is hoped that further opportunities will occur of lecturing to the school teachers on these important subjects. The teachers can reach such a large and plastic audience, that sowing the seed of accurate knowledge of our local diseases should bear fruit an hundredfold.

The Press is our other great educationist, and I am glad to say that our newspapers still show a lively interest in the public health and welfare.

Cloth Market.

A kind of impromptu cheap-sale cloth market grew up on some vacant land in Penang Road about the middle of the year.

No official approval had been obtained or sought, but no one wanted to hinder an enterprise which seemed likely to tend to reduce the cost of living.

Unfortunately the place soon became hopelessly insanitary, and neither owner nor occupants seemed able to abate the nuisance.

Moreover there was considered to be a great risk of a serious outbreak of fire on the premises, so the stalls had to be cleared away. At present, a suitable market building is being erected on the same ground and we hope soon to see a flourishing cloth market established.

Theatres.

The theatres and cinema halls were inspected regularly once a week.

Some of them were painfully dirty every time I saw them, and a strong attempt is being made to secure material improvement.

Some theatres seem to be constantly housing too many people ; recently in a night raid we found over 180 people sleeping in one theatre, including 50 odd vagrants on the wooden front verandah. This theatre, and I cannot say that it has been the most insanitary in the town, has a wooden floor, imperfectly jointed. Dogs, cats and chickens are regular habitués, and the state of the floor and the ground underneath may be left to the imagination.

The place is unclean, and the scattering of a few drops of disinfectant fails even to make it smell clean for the moment.

I hope to see a great improvement in the sanitary status of our theatres before the end of 1922.

Crown Property.

In July it was officially announced that the Muncipal Health Officer was to be responsible for all sanitation within Municipal limits, Crown property not being excluded.

This seems a wise decision, as the old system of leaving the sanitation of Crown lands and property to the Government medical department was never satisfactory from our point of view.

Domestic Water Supply.

There is no question of greater importance to any town than the purity and sufficiency of its water supply.

Our Municipal water supply has acquired a deservedly good reputation but it has long been felt to be a hygienic mistake that so many people still used well water.

During the year, 184 deaths were reported as due to Enteric Fever, Dysentery, or Diarrhoea.

A further 186 were returned as dying of Enteritis, of whom 116 were infants under one year of age.

These diseases are usually classed as "water-borne" and are certainly capable of being conveyed by water.

On close scrutiny, it does not appear that an unduly large proportion of any of these cases occurred in houses not supplied with Municipal water-service pipes.

We have therefore to consider carefully the two main varieties of water supply in Penang.

The chemical and bacteriological reports on the Municipal supply taken at various points, have been shown to me by the Water Engineer, and are reasonably good. The possible sources of pollution in our catchment areas are well recognized, and so far as possible controlled.

The supervision of the catchment area has been transferred to the Water Engineer's department, on the ground of expediency: it is most desirable that we should have as soon as possible our catchment area entirely cut off from all human dwellings, whether by contour drain or otherwise.

The wells in Penang are surface wells, few are steined, and few are adequately protected by parapet from surface contamination. Such wells are quite unsafe for domestic use.

Being convinced that these wells were even more dangerous than convenient we had many of them filled in, and this work is being carried on. The Water Engineer has helped very materially to lessen the inconvenience resulting to householders, by placing additional standpipes with self closing-taps in the most suitable available positions.

The effect of this action must be considered not only as regards the probable gain to the health of the community, but also with a view to the increased possibility of our running short of water owing to the greater number of people using the Municipal supply.

This is receiving the attention of the Water Engineer, but it may not be of place to comment generally on the water consumption here and elsewhere.

The average for towns in Great Britian is stated to be 35 gallons per head per day. The general tendency of municipal authorities, both in Britain and in America, is towards the provision of much more than this. Some two thousand years ago, the Romans had not less than 300 gallons per head per day. The greater part of this was used for public baths and fountains, but it is a tribute to their intelligence that they did realize that it was worth all they spent on aqueducts and other works to secure a plentiful supply of water.

The daily consumption per head in Penang is estimated at 45½ gallons. This is certainly not too much. There can be no doubt that the greater amount required here for washing clothes, bathing, and drinking does far more than compensate for the smaller amount we use by not having a water carriage system for sewage, and some day we may realize that we want a water carriage system.

Medical Attendance.

Medical advice or treatment was given to Municipal employees 2,106 times.

The total for 1920 was 1778, and for 1919 was 850.

The number seen per month varied from 242 in October to 123 in January, the variation perhaps depending more on the number of holidays in the month than on the state of the weather.

The number seen in the different departments were:— Engineer 868, Health Office 375, Electrical 309, Fire Brigade and Rikisha Office 201, Water 194, Secretariat 105, Veterinary Surgeon 54.

Registration of Births and Deaths.

The system inaugurated in 1920 has been adhered to with slight modifications.

The difficulty of finding the true address of the informant still exists, but the registration is on the whole satisfactory.

The time allowed for the registration of births is far too long. It should be changed from the present 14 days to at the most 48 hours. This might facilitate registration and would certainly give our Nurses more chance of reaching babes before they are hopelessly ill or even dead.

It seems extraordinary that such an obvious life-saving amendment should not yet have been passed, in spite of its having been strongly advocated by men whose opinion must carry weight.

Maternity Hospital.

The annual report is appended.

Some years ago Dr. Park stated his opinion that all the Hospitals in Penang should be under one control, either Municipal or Government, for the sake of economy and to minimize the difficulty of arranging a suitable nursing staff.

The Government Hospitals already formed part of a larger service, and it was decided to recommend that the Government should assume control of the Maternity Hospital.

This has now been done, Municipal control ceased on 31st December 1921.

Municipal Districts Nurses

On 31st December 1920, we had one Eurasian District Nurse and one Chinese part-time District Nurse,—a staff quite inadequate for our needs, however hard they might work.

Miss G. Richards, a qualified European midwife was appointed senior District Nurse on 1st February. She threw herself into the work with great vigour, but most unfortunately her health gave way and she felt compelled to resign on 31st July.

Miss A. Laurie, a lady fully trained both in general nursing and in midwifery, has carried on the work most successfully. She came on 1st August straight from our Maternity Hospital, where she had worked for eighteen months.

To assist her, we are now authorized to employ seven Chinese qualified midwives as part-time District Nurses.

This staff is doing good work, but is still inadequate to meet the needs of the town.

Indeed, all their work is done in the town area proper, as the staff are unable to deal with the country district of the Municipality.

Each of our Chinese midwives is in charge of a definite area, where they see the babies who are not under the supervision of a qualified doctor.

Miss Laurie supervises their work, as well as that of other midwives in the town area.

In order to combat the high infant mortality we need not only a larger staff of District Nurses, but also more qualified and fewer unqualified midwives in the town.

It is encouraging to note that one good result of employing locally qualified midwives as part-time District Nurses has been an increased demand for their services in private cases. This may be taken as a better appreciation by the people of the superiority of a qualified midwife to an unqualified bidan.

Inf.-Mort

There were 3768 births during the year, and our Nurses paid 15,762 visits; in 1920 they recorded 5576 visits.

In the Section on Registration I have commented on the unnecessarily long period of 14 days allowed for registering births.

Of our total infant deaths, no less than 43 per cent occurred before the child was one month old. It is terrible to think of the number of these lives which might have been saved had there been prompt notification and proper skilled nursing given.

Milk.

We had 22 samples analyzed, 21 of which were found to be adulterated by the addition of an amount of water varying from 3 to 77 per cent of the sample.

22 summonses were issued for selling adulterated milk and 18 convictions resulted. The fines inflicted ranged from $25 to $250, and amounted altogether to $ 1332. In 1920 the maximum fine was $ 500 and the total $ 4,455.

234 milk sellers were registered, of whom 60 had no cows of their own. We may compare these figures with those of the four preceding years.

TABLE XVI.

	1917	1918	1919	1920	1921
Number of licensees ...	217	237	232	272	234
Number without cows ...	86	108	100	82	60

The frequency with which milk is adulterated, and the degree to which it is adulterated, may well cause us some anxiety.

In our 1920 report, the following sentence occurs, "I believe there is a milk vendors' ring, with a common fund from which fines are paid. If a succession of heavy fines was made, heavy fines even for first offences, the ring might be broken".

Dr. Rose did not believe this without having some reason for so doing, and I am inclined to agree with him. But I thought it would be interesting to consider for a moment the elementary mathematics of the worst case we had during the year.

One sample had "at least 77 per cent of added water," according to the Government Analyst.

The heaviest fine inflicted was $ 250.

Had the man who sold milk with 77 per cent water been fined $250, it would have taken him little more than three weeks to pay off the fine by his profits on the sale of water, if he averaged the same percentage.

Even without a milk vendors' ring, then, the adulteration of milk seems profitable.

Unfortunately the 77 per cent merchant was not fined at all, he ran away to India instead.

As the law stands, no seller of adulterated milk need ever be fined if he is careful. I may mention one point alone.

When our agent finds milk which seems poor, he tests it roughly, and if necessary proceeds to take samples in the official manner. The milkman probably knows the milk is below standard and may at once leave the town if he wishes. Or he may wait until we have the Analyst's report and have applied for and received a summons.

From the date of service of the summons, he cannot be brought to Court within 14 days —a whole fortnight in which to arrange his affairs and make his departure !

That so many of them stand their trial and cheerfully pay their fines is a great tribute to the climate of Penang,—or is it rather a proof of easy profits to be made here ?

Milksellers must have their badge and licence with them when selling or delivering milk. Our by-law ordering this was strengthened during the year by a clause insisting that the badge, should "be worn exposed on the left arm." We had several times found a man with a badge but no licence, his excuse being that he had forgotten it ; we also found men with licence but no badge the excuse then being that the badge string had broken.

Had this been allowed to continue it would have been easy for persons, whom we thought unfit to receive a licence, to borrow a badge, leaving with its proper owner the licence, which by the 1920 amendment must bear the licensee's photograph.

It is now easy to see as we pass along the street whether the milkmen have their badges or not.

A new by-law was passed. "Any vessel which is used for the collection, storage, or conveyance of fresh milk shall not be used for any other purpose and shall be cleaned with boiling water before use."

The regulations under the sale of Food and Drugs Ordinance practically cover this, but it seemed well to have it clearly stated in our by-laws, which milk vendors are more likely to read.

Quarantine Camp, Perak Road.

As there was no serious epidemic, it was a quiet year for the camp. This was fortunate, for the camp has a dilapidated appearance and much work would be required to fit it for the reception of large numbers.

The Engineer has made a survey, and I hope the work will be commenced early in 1922.

There were 128 admissions, and four persons remaining in Hospital on 1st January 1921, making a total of 132 persons in Hospital during the year, including the 49 healthy contacts.

Their distribution (a) according to disease, and (b) according to nationality is shown in Tables XVII and XVIII. A pleasing feature is the high percentage of recoveri~~ng~~es in Cerebro-Spinal Meningitis, most of the cases were seriously ill and their recovery was more hoped for than expected.

TABLE XVII.

	Remaining on 1st Jan. 1921.	Admitted.	Total treated.	Discharged.	Died.	Remaining on 31st Dec. 1921.	Average stay in Hospital.	Remarks.
Small-pox ...	...	4	4	2	2	...	28 days	
Chicken-pox ...	3	58	61	60	1	...	19 ,,	Died of Lobar Pneumonia..
Measles ...	...	5	5	4	1	...	8 ,,	Died of Broncho-Pneumonia.
Plague ...	...	1	1	1	...	...	14 ,,	
Cerebro-Spinal Meningitis ...	...	9	9	7	2	...	22 ,,	
Malaria ...	...	1	1	1	...	...	14 ,,	Sent in as Cerebro-Spinal Meningitis.
Mumps ...	...	2	2	2	...	...	17 ,,	
Contacts ...	1	48	49	49	...	...	...	
Total ...	4	128	132	126	6	...	...	

TABLE XVIII

Nationality	Remaining on 1st Jan. 1921	Admitted	Total treated	Discharged	Died	Remaining on 31st Dec. 1921.
European ...	...	...	...	...	...	...
Eurasian ...	...	4	4	4	...	...
Chinese ...	...	18	18	16	2	...
Malay ...	...	12	12	11	1	...
Indian ...	4	94	98	95	3	...
Total ...	4	128	132	126	6	...

The number of vaccinations performed in the Camp was 67.

The working of the Camp was satisfactory, the resident Dresser proving careful, efficient, attentive to the patients, and tactful in managing the staff.

Two of the attendants had to be dismissed for disobeying orders, in that they went outside the Camp on private business while Small-pox was in the Camp. I do not consider that any punishment milder than instant dismissal will suit the crime of so dangerous an infringement of orders.

The acquisition of a new site for our Municipal Quarantine Camp was carefully considered, and was postponed, economy, or rather the cutting down of expenditure, being an important consideration.

It is possible that this postponement will be regretted at a later date when a new site is wanted and it may be difficult to obtain a satisfactory one even at an enhanced price, but the present site suffices for our immediate needs and expenditure on what cannot be proved urgently necessary is at present ruled out of consideration.

Staff.

Dr. Rose went home on leave on 5th May.

Miss Richards was appointed Senior District Nurse on 1st February, and resigned owing to ill-health on 31st July.

Miss Laurie was appointed Senior District Nurse on 1st August.

Mrs. Scully, assistant nurse, resigned on 1st September

S. S. I. H. L. McCulloch was temporarily promoted to the rank of Inspector and given charge of the second District on 1st September.

S. S. I. C. G. Scully resigned on 1st July 1921.

The following Sanitary Sub-Inspectors were appointed.

J. Loh, Division VIII, 14th May.

W. P. P. Pereira, Division IV, 17th May.

E. V. Lessler, Division VII, 1st July.

P. Preedy, Division II, 1st July.

Ow Leong Chye, Division X, 1st July.

U. Balhetchet, Division III, 1st August.

V. E. Rozells, (temporary appointment), Division VI, 1st September.

Lim Thean Soo, (temporary appointment), Division I, 1st September.

The staff worked well through the year.

I have the honour to be,
Gentlemen,
Your obedient servant,
G. S. GLASS,
Ag. Municipal Health Officer.

Penang, 1st February, 1922.

To

THE MUNICIPAL HEALTH OFFICER,
PENANG.

Sir,

I have the honour to submit my report of the work done by the staff during the year ending 31st December 1921 as follows :—

General Sanitation.

The staff made 21,722 inspections and 21,827 re-inspections.

They found 2,158 defective and 2,266 filthy houses.

3,418 notices were issued and 3,424 (including 43 unserved and brought forward from 1920) were served ; of these 3,967 (including 1201 outstanding on 31.12.20) have been complied with.

(Vide detailed list below).

Notices.	Outstanding on 31.12.20.	Unserved on 31.12.20.	Issued 1921.	Served in 1921.	Unserved on 31.12.21.	Complied.	Work started.	Cancelled.	Carried forward to 1922.
Nuisance ...	181	1	193	192	2	220	31	1	152
Lime washing ...	4	...	875	863	12	659	37	1	207
Latrines ..	...	...	40	37	3	28	1	...	9
Drains ...	3	...	74	73	1	60	5	...	16
Filthy premises ...	...	...	388	386	2	384	...	...	2
Com. Lod. Houses ...	309	...	389	387	2	583	16	24	89
Trades ...	231	40	213	253	...	475	...	8	1
Bakeries ...	462	...	167	167	...	623	...	6	...
By-laws ...	...	...	16	16	...	13	1	...	3
Partitions ...	6	...	600	597	3	516	28	1	86
Mosquitos ...	5	2	270	268	4	243	16	...	30
Rats, Sec : 228 ...	...	...	29	27	2	22	...	...	5
Phthisis, Ord : 157 ...	...	...	141	138	3	138	...	...	...
Wells Sec : 247 ...	...	...	23	20	3	3	...	...	17
Total ...	1201	43	3418	3424	37	3967	135	41	617

41 Notices were cancelled for various reasons.

220 Nuisance Notices were complied with during the year dealing with 551 houses of which 210 houses were altered structurally to provide light and ventilation and land was set apart for back lanes or passages.

344 houses were repaired, i.e. floors, drains and latrines put in order.

4 wells were closed, 3 swampy lands were filled in and 41 other nuisances abated.

In compliance with 31 nuisance notices work has been started.

Water Catchment Area.

The former Inspector of the Water Catchment Areas did not inspect the Catchment Areas this year, he having been taken off that duty and given a division; he inspected the Public cemeteries 166 times and the private ones 197 times.

Exhumations.

37 applications for exhumations of bodies were received but only 30 bodies were exhumed under special licence.

Destruction of Rats.

The ratcatchers worked to the end of May and then were taken off that work, during the five months they caught 3,451 rats, which were burned at the incinerator.

Passengers.

141 passengers arrived from infected ports and passed through this office as against 213 last year.

Plans.

224 plans were sent in and examined in this office as against 165 last year.

Prosecutions.

368	summonses were issued during the year.
61	brought forward from 1920 (vide list A)
Total 429	

320	convictions were obtained, including 3 milk men summarily arrested for selling milk without a license.
28	withdrawn
6	dismissed
78	carried forward
Total 432	

21 Abatement of Nuisance, 2 Closing and 14 Mandatory orders were obtained.

The fines imposed by the Magistrates amounted to $4180.50 as against $6568.10 last year.

Disinfections.

190 houses were disinfected during the year, of which 127 were done by the occupiers themselves for Phthisis, as follows:—

Cerebro-spinal Meningitis ...	8
Plague (suspected) ...	1
Small-pox	3
Chicken-pox	38
Phthisis	129
Diphtheria	3
Measles	4
Enteric	1
Puerperal fever	2
Leprosy	1
Total ...	190

The house disinfected were distributed as follows:—

Cerebro-spinal Meningitis.—Queen Street (2), Love Lane, Campbell Street, Sungei Pinang (Immigration Depot), Acheen Street, Cannon Square and Ah Quee Street (1 each).

Plague.—Bridge Street (1).

Small-pox.—Caunter Hall, King Street, Penang Road (Detective Station) 1 each.

Chicken-pox.—Patani Road (5), Transfer Road, East Jelutong, Kinta Lane, Noordin Street, Kedah Road, Penang Road (3 each), Hutton Lane (2), Muntri Street, Brick Kiln Road, Seang Tek Road, Prangin Road Ghaut, Armenian Street, Green Lane, Love Lane, Kampong Kolam, Prangin Road, Perak Road, Pangkor Road, Beach Street, Sungei Pinang (P. W. D. Stores) 1 each.

Phthisis.—Magazine Road (11), Bridge Street, Cintra Street, Rope Walk (8 each), West Jelutong (7), Chulia Street (6) Hutton Lane and Kedah Road (5 each), Burmah Road and Kimberley Street, (4 each), Transfer Road, Campbell Street and Beach Street, (3 each), Love Lane, Muntri Street, Malacca Street, Penang Street, Queen Street, Pitt Street, Carnarvon Street, Cannon Square, Armenian Street and Jelutong Road and East Jelutong (2 each), Aier Itam Road, Kampong Java Bahru, Dato Kramat Road, King Street, Brick Kiln Road, Hong Kong Street, Maxwell Road, Tamil Street, Ah Quee Street, Western Road, Halfway Road, Malay Street, Noordin Street, Presgrave Street, College Lane, Sungei Pinang Road, Stewart Lane, Klang Street, Perak Road, Tye Sin Street, Carnarvon Lane, Kuala Kangsar Road, Caunter Hall, Pangkor Road, Bengal Lane, McAlister Road, Market Lane, Singora Lane and Kajang Road (1 each).

Diphtheria.—Acheen Street, Green Hall, Campbell Street (1 each).

Measles.—Burmah Road, Chulia Street, Beach Street and Chulia Lane (1 each).

Enteric fever.—Perak Road (1).

Puerperal fever.—Kinta Lane and Perak Road (1 each).

Leprosy.—Perak Road (1).

Trades.

The fees collected for Trade Licenses amounted to $7671.60 against $7361.70, an increase of $309.90.

(vide attached list " B ")

Common Lodging Houses.

622 Common Lodging Houses were licensed during the year as against 543 in 1920. The fees collected amounted to $1146 against $991.40, an increase of 78 houses and an increase of fees amounted to $154.60.

Lodging Houses under Minor Offences Ordinance.

15 Lodging Houses under the Minor Offences Ordinance were licensed during the year as against 5 in 1920.

Milk.

234 Milk sellers were registered in 1921 as against 272 in 1920.

22 summonses were issued for selling Milk adulterated with water. 42 cases were brought forward from 1920.

21 convictions were obtained, including 3 men arrested for selling milk without licences.

6 cases were withdrawn (old ones).

Fines amounting to $1332 were obtained as against $4455 in 1920 a decrease of $3123.

40 cases have been carried forward to 1922.

One sample had 77 per cent. of added water.

I would like to point out the difficulties we are experiencing under the Food and Drugs Ordinance where a summons is not returnable under 14 days.

Our Laboratory Assistant buys a sample of milk from a Milkman who knows his milk is adulterated with water, he also knows that a summons is bound to follow so he immediately disappears either to India or the F. M. S.

In 1920 we had 21 summonses unserved, three of the men had previous convictions, one of whom had two previous convictions.

In addition to this, eleven warrants were granted for the arrest of the defendants who had received their summonses and then gone away, three of these had previous convictions.

In 1921 four summonses were unserved, one man of which had a previous conviction, also four warrants were granted, one for a man who had a previous conviction.

It would simplify matters if our Laboratory Assistant, on testing the milk with the Lactometer and finding it contained, say 30 per cent. or more of added water, could take the milkman to a Police Station and charge him ; the man could be let out on bail to appear on a certain day when we could produce the analyst's certificate.

Anti-Mosquito Works.

The Anti-Mosquito gangs did good work cutting down vegetation, digging, levelling and clearing ditches, collecting old tins coconut shells and burying them. at the following places: – Perak. Irving, Burmah. Dato Kramat, Siam, Patani, Trang, Edgecumbe, Kelawei, Anson, Cantonment, Northam, Aier Raja, Magazine, Penang, Transfer, Yahudi, Gottlieb, Sungei Pinang, Jelutong, Seang Tek, Merican, Pahang, Dunlop, Batu Lanchang, Scotland, York, Jones, Aier Etam, Barrack, Vermont, River, Brown, Scott, Rangoon, Kedah, Race Course, and Argyll Roads, New Lane, Madras, Ngah Aboo, Aboo Sittee, Singora, McAlister, Kinta, Duftree, and Hutton Lanes and all reserved roads leading off them.

McNair, Noordin, Presgrave, Tye Sin, Cecil and Sandilands Streets, Pulo Tikus Cemetery compound, Rope Walk, Lorong Slamat, Lorong Susu, West Jelutong, Caunter Hall, East Jelutong and Kampong Java.

All ditches, pools and swamps found within the Town area were regularly sprayed with kerosene and crude oil, also the Race Course ditches and the Fort Moat, until November, when it was filled in, once a week; for which purpose 5460 gallons crude oil and 2440 gallons of kerosene oil were used; the cost was $3,924.72 cents against $3,993.80 in 1920.

56 lands and compounds were cleaned and levelled by these gangs at the cost of $1,267.93 paid by the owners.

The vacant land at Weld Quay and Victoria Street was cleaned during the year and all the vagrants' shanties removed and burned at the incinerator.

The Chokra gang under Sub-Inspector G. F. Scully did very good work, collecting old tins and burying them and smashing up old coconuts and cutting out bamboo stumps.

Three men were detached from the gangs and put on to cement the holes in the road side trees.

Vaccinations.

Messrs R. J. Rangel and P. P. Aeria were taken off their Sanitary work and made whole time vaccinators, Rangel in the Town district and Aeria the country.

They made 1409 primary vaccinations and re-vaccinations for which they used 1000 tubes of Vaccine Lymph.

The Saigon lymph we bought when the Hong Kong lymph was out of stock proved a failure and several lots of Hong Kong lymph gave us negative results.

Staff.

S. S. I. Scully (C. G.) resigned on 1st July.

Mr. John Loh joined the service as Sanitary Sub-Inspector on 14-5-21 and was in charge of Division VIII; Mr. W. P. P. Pereira joined on 17-5 21 and was given Division IV in place of C. G. Scully who resigned; Messrs E V. Lessler, P. Preedy and Ow Leong Chye were taken into the service on the 1st July and placed in Divisions VII, II and X respectively; Mr. O. Balhetchet joined on 1-8-21 and was put in Division III in place of Mr. A. Mathuray; Messrs V. E Rozells and Lim Thean Soo joined on 1-9-21 and put into Division VI and I Mr. H. L. McCulloch was promoted temporarily to Sanitary Inspector and placed in charge of District II, releasing me of a district and so giving me more time to supervise all three districts.

Mr. B. B. Peters was taken off the Water Catchment Areas and put in Division X in place of Mr. P. P. Aeria.

Mr. M. D' Souza was taken off Division I and is employed to relieve any Inspector in case of sickness and to assist wherever he may be wanted.

Mr. Mathuray was relieved of his division and put in charge of the oilers.

Division V was incorporated in District I and Division VI in District II.

The Staff with few exceptions worked well.

I have the honour to be,

Sir,

Your obedient servant,

W. A. WARD. (C. S. I.)

A

Prosecutions	Bt. forward from 1920	Issued in 1921	Cases in Court	Convictions	Withdrawn	Dismissed	A. N. O.	C. O.	P. O.	M. O.	Total	Fines		Costs.	
												$	cts.	$	cts .
Nuisance Notice	9	43	44	40	4	...	21	2	...	2	25	245	00	20	00
Nuisance Orders	2	11	11	10	1	...	...	...	...	...	...	348	00	5	00
Drains and Latrines	...	15	14	12	2	...	...	...	...	10	10	...	...	6	00
Trades	2	20	21	18	1	2	...	...	...	...	...	318	00	9	00
Com. Lod. Houses	...	61	61	57	4	...	...	...	...	...	...	1092	00	28	50
Breach C. L. H. By-laws	...	23	...	...	...	...	...	...	...	...	...	...	...	...	...
Filthy Premises	...	38	38	36	2	...	...	...	...	...	...	202	00	18	00
Sec : 160/161	...	13	13	13	...	...	...	...	...	1	1	116	00	6	50
Mkt. Garden By-laws	...	4	4	4	...	...	...	...	...	...	...	37	50	2	00
Bakery By-laws	...	46	45	41	2	2	...	...	...	...	...	30	00	1	00
Milk	42	22	27	21	6	...	...	...	...	...	...	1332	00	69	50
Failing to report Birth	...	21	21	19	1	1	...	...	...	...	...	49	00	9	50
Breach of Pig By-laws	3	...	3	—	3	...	...	...	...	...	...	...	...	..	...
,, Cattleshed ,, ...	...	8	6	6	...	...	...	...	...	...	...	60	00	3	00
Lime Washing	1	1	2	2	...	...	...	...	...	...	...	15	00	1	00
Failing to report Small-pox	...	1	1	1	...	...	...	...	...	...	...	20	00	...	50
Failing to report Death	...	1	1	...	1	...	...	...	...	...	...	...	...	...	...
Failing to vaccinate	...	29	29	28	1	...	...	...	...	...	...	66	00	14	00
Using N/S as Manure	...	4	4	4	...	...	...	...	..	...	...	100	00	2	00
Mosquitos	2	7	9	8	...	1	...	...	...	1	1	150	00	4	00
Total ...	61	368	354+	320+	28	6	21	2	...	14	37	4180	50	199	50

Including 3 milkmen arrested for selling Milk without licences.

B

Trade Licenses.	No. 1920	Fees.		No. 1921	Fees.		No. Increase	Fees.		No. Decrease	Fees.	
		$	cts.		$	cts.		$	cts.		$	cts.
Coal Depot	1	12	00	1	12	00	...	...	...	...	...	...
Charcoal Depot	36	216	00	42	252	00	6	36	00	...	...	..
Candle Factory	16	128	00	16	128	00	...	...	...	...	...	...
Cattle shed and Cattle ...	84	519	00	52	353	00	...	...	...	32	166	00
Wood Depot	76	456	00	79	474	00	3	18	00	...	...	...
Dyeing House	8	80	00	6	60	00	...	...	...	2	20	00
Fish Storing and Curing ...	51	612	00	46	552	00	...	...	...	5	60	00
Braziers, Foundries & Smithies ...	63	126	00	58	116	00	...	...	...	5	10	00
Pig Stys	36	72	00	50	100	00	14	28	00	...	...	...
Pig Stys (Free)	334	...	...	345	...	.	11	...	...	...	...	...
Pepper Washing Factory ...	...	...	...	2	20	00	2	20	00	...	...	...
Stable and Horses ...	2	11	00	30	166	00	28	155	00	...	...	...
Sheep and Goats	8	28	70	9	37	60	1	8	90	...	...	...
Tanneries	22	528	00	20	480	00	...	...	...	2	48	00
Blachan Factories ...	3	36	00	2	24	00	...	...	...	1	12	00
Rags, Bones and Feathers ...	3	36	00	4	48	00	1	12	00	...	...	...
Soap Factory	10	80	00	16	128	00	6	48	00	...	...	...
Bakeshops	41	205	00	39	195	00	...	...	...	2	10	00
Cookshops	193	965	00	188	940	00	...	.	...	5	25	00
Eatingshops	541	2705	00	610	3050	00	69	345	00	...	...	...
Storing and Curing hides ...	5	60	00	7	84	00	2	24	00	...	...	...
Sago Factory	1	10	00	1	10	00	...	...	...	...	...	...
Attap Kajang and Straw ...	43	129	00	43	129	00	...	...	...	...	...	...
Sugar Boiling	10	60	00	9	54	00	...	...	...	1	6	00
Market Gardens	64	...	...	65	...	...	1	...	...	...	...	...
Drying Cloth	2	10	00	2	10	00	...	...	...	...	...	...
Milk Sellers	272	272	00	234	234	00	...	...	...	38	38	00
Minor offences Ordinance ...	5	5	00	15	15	00	10	10	00	...	...	...
Total ...	1930	7361	70	1991	7671	60	154	704	90	93	395	00
Common Lodging Houses ...	543	991	40	621	1146	00	78	154	60	...	...	...